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APPLICATION FOR LETTERS PATENT

**Saving Audio Source Identifiers for Soundtracks in a
Gaming System**

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RELATED APPLICATIONS

This application is a continuation-in-part of U.S. Patent Application Serial No. 09/802,661, U.S. Publication No. 20020128067, entitled "Method and Apparatus for Creating and Playing Soundtracks in a Gaming System" (currently pending).

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TECHNICAL FIELD

This invention relates to gaming systems and, more particularly, to saving audio source identifiers for soundtracks in a gaming system.

BACKGROUND

Gaming systems currently available on the market are capable of playing game discs, music CDs, and movie DVDs from a disc drive. For example, the Playstation® 2 gaming system from Sony Corporation provides the ability to play games, music, and video titles from a disc inserted in the console. Certain gaming systems also provide a modem or other mechanism for establishing an online connection to facilitate online gaming.

1 Current gaming systems play games that typically include a game
2 soundtrack. The game soundtrack is stored on a disc along with the game (i.e., a
3 game disc). This game soundtrack includes music that is created by or selected by
4 the game developer. If the user of the gaming system dislikes the game
5 soundtrack or grows tired of the same soundtrack being played repeatedly, some
6 gaming systems allow the user to launch the game from the game disc, and then
7 replace the game disc with an audio CD that is played by the gaming system while
8 the game is executed. However, if the game requires additional information from
9 the game disc (e.g., when changing from one level to another), the user must
10 remove the audio CD and re-insert the game disc. After the additional information
11 has been retrieved from the game disc, the game disc can be removed from the
12 gaming system and replaced with the audio CD. This switching of discs disrupts
13 the gaming experience and is a nuisance to the user.

14 An additional problem that some gaming systems have is that such
15 soundtracks frequently do not display user-friendly information. For example, the
16 titles of songs in a soundtrack are often not displayed to the user. This lack of
17 display of information is cumbersome to the user as it makes it more difficult for
18 the user to identify which songs are in which soundtracks.

19 The saving of audio source identifiers for soundtracks in a gaming system
20 described herein reduces these and other problems.

21 22 **SUMMARY**

23 Saving audio source identifiers for soundtracks in a gaming system is
24 described herein.

1 According to one aspect, an audio track is obtained from an audio source
2 and saved so that a copy of the audio track is available when the audio source is no
3 longer accessible to the game console. The audio track is at least part of a user-
4 created soundtrack and/or a user-selected soundtrack. The identifier of the audio
5 source is saved, and when a database containing meta data associated with the
6 audio track is available, the meta data associated with the audio track is obtained
7 from the database, based at least in part on the identifier saved on the storage
8 device, the obtained meta data is stored

9 According to another aspect, a process includes obtaining an audio track
10 from a source and saving the audio track on a storage device of a game console.
11 An identifier of the source is also saved on the storage device. The process waits
12 for a future application to be subsequently installed on the game console. After
13 the future application is installed on the game console, the process includes using
14 the saved identifier to obtain meta data associated with the audio track from a
15 database and store the meta data associated with the audio track on the storage
16 device

17 18 **BRIEF DESCRIPTION OF THE DRAWINGS**

19 Fig. 1 illustrates a gaming system that implements a uniform media portal
20 architecture.

21 Fig. 2 is a block diagram of the gaming system.

22 Fig. 3 illustrates a network gaming system in which the Fig. 1 gaming
23 system is connected via a network to other consoles and services.

24 Fig. 4 illustrates a navigation hierarchy employed by the gaming system.
25

1 Fig. 5 illustrates a graphical user interface depicting the main menu of the
2 gaming system.

3 Fig. 6 is a flow diagram of the main menu navigation process that is
4 performed after the gaming system is initialized.

5 Fig. 7 illustrates a graphical user interface depicting a music collection
6 menu that is accessible from the main menu.

7 Fig. 8 illustrates a graphical user interface depicting a music player that is
8 accessible from the music collection menu.

9 Fig. 9 illustrates a graphical user interface depicting another example music
10 player.

11 Fig. 10 illustrates a graphical user interface depicting another example
12 music collection menu.

13 Fig. 11 illustrates a graphical user interface depicting a screen display used
14 to select an existing soundtrack or create a new soundtrack.

15 Fig. 12 illustrates the creation of a soundtrack using a variety of different
16 audio sources.

17 Fig. 13 is a flow diagram illustrating a process for creating a new
18 soundtrack.

19 Fig. 14 illustrates a graphical user interface depicting a screen displayed
20 during the creation of a soundtrack.

21 Fig. 15 is a flow diagram illustrating a process that determines which
22 soundtrack to play when a particular game is launched.

23 Fig. 16 is a flow diagram illustrating an example process that adds meta
24 data to the gaming system.

25

1 Figs. 17A and 17B illustrate example screens displayed to identify the
2 audio tracks in a soundtrack.

3 Fig. 18 illustrates another example screen.

4 5 **DETAILED DESCRIPTION**

6 The method and apparatus discussed herein allows users to create and play
7 soundtracks in a gaming system. A soundtrack can be played by itself or played at
8 the same time a game is executed, thereby replacing the soundtrack provided with
9 the game. The soundtrack is created by copying audio data (or audio tracks) from
10 one or more audio sources and storing the audio data as a soundtrack on a hard
11 disk drive. An identifier of the source(s) may also be stored on the hard drive so
12 that meta data, such as song titles for audio tracks, can be subsequently retrieved
13 and used by the gaming system. The audio sources may include audio CDs, audio
14 DVDs, game discs, and online sources that contain music files available for
15 download. Since the soundtrack is played from the hard disk drive, it is not
16 necessary to remove the game disc or other media from the gaming system prior to
17 playing the soundtrack.

18 Fig. 1 shows an example gaming system 100. It includes a game console
19 102 and up to four controllers, as represented by controllers 104(1) and 104(2).
20 The game console 102 is equipped with an internal hard disk drive and a portable
21 media drive 106 that supports various forms of portable storage media as
22 represented by optical storage disc 108. Examples of suitable portable storage
23 media include DVD, CD-ROM, game discs, and so forth.

24 The game console 102 has four slots 110 on its front face to support up to
25 four controllers 104, although the number and arrangement of slots may be

1 modified. A power button 112 and an eject button 114 are also positioned on the
2 front face of the game console 102. The power button 112 switches power to the
3 game console and the eject button 114 alternately opens and closes a tray of the
4 portable media drive 106 to allow insertion and extraction of the storage disc 108.

5 The game console 102 connects to a television or other display (not shown)
6 via A/V interfacing cables 120. A power cable 122 provides power to the game
7 console. The game console 102 may further be configured with broadband
8 capabilities, as represented by the cable or modem connector 124 to facilitate
9 access to a network, such as the Internet.

10 Each controller 104 is coupled to the game console 102 via a wire or
11 wireless interface. In the illustrated implementation, the controllers are USB
12 (Universal Serial Bus) compatible and are connected to the console 102 via serial
13 cables 130. The controller 102 may be equipped with any of a wide variety of
14 user interaction mechanisms. As illustrated in Fig. 1, each controller 104 is
15 equipped with two thumbsticks 132(1) and 132(2), a D-pad 134, buttons 136, and
16 two triggers 138. These mechanisms are merely representative, and other known
17 gaming mechanisms may be substituted for or added to those shown in Fig. 1.

18 A memory unit (MU) 140 may be inserted into the controller 104 to
19 provide additional and portable storage. Portable memory units enable users to
20 store game parameters and port them for play on other consoles. In the described
21 implementation, each controller 104 is configured to accommodate two memory
22 units 140, although more or less than two units may be employed in other
23 implementations.

24 The gaming system 100 is capable of playing, for example, games, music,
25 and videos. With the different storage offerings, titles can be played from the hard

1 disk drive or the portable medium 108 in drive 106, from an online source, or from
2 a memory unit 140. A sample of what the gaming system 100 is capable of
3 playing back include:

- 4
5 1. Game titles played from CD and DVD, from the hard disk drive, or
6 from an online source.
- 7 2. Digital music played from a CD in the portable media drive 106, from a
8 file on the hard disk drive (e.g., Windows Media Audio (WMA) format),
9 or from online streaming sources.
- 10 3. Digital audio/video played from a DVD disc in the portable media drive
11 106, from a file on the hard disk drive (e.g., Active Streaming Format),
12 or from online streaming sources.

13
14 Fig. 2 shows functional components of the gaming system 100 in more
15 detail. The game console 102 has a central processing unit (CPU) 200 and a
16 memory controller 202 that facilitates processor access to various types of
17 memory, including a flash ROM (Read Only Memory) 204, a RAM (Random
18 Access Memory) 206, a hard disk drive 208, and the portable media drive 106.
19 The CPU 200 is equipped with a level 1 cache 210 and a level 2 cache 212 to
20 temporarily store data and hence reduce the number of memory access cycles,
21 thereby improving processing speed and throughput.

22 The CPU 200, memory controller 202, and various memory devices are
23 interconnected via one or more buses, including serial and parallel buses, a
24 memory bus, a peripheral bus, and a processor or local bus using any of a variety
25 of bus architectures. By way of example, such architectures can include an

1 Industry Standard Architecture (ISA) bus, a Micro Channel Architecture (MCA)
2 bus, an Enhanced ISA (EISA) bus, a Video Electronics Standards Association
3 (VESA) local bus, and a Peripheral Component Interconnects (PCI) bus, also
4 known as a Mezzanine bus.

5 As one suitable implementation, the CPU 200, memory controller 202,
6 ROM 204, and RAM 206 are integrated onto a common module 214. In this
7 implementation, ROM 204 is configured as a flash ROM that is connected to the
8 memory controller 202 via a PCI (Peripheral Component Interconnect) bus and a
9 ROM bus (neither of which are shown). RAM 206 is configured as multiple DDR
10 SDRAM (Double Data Rate Synchronous Dynamic RAM) that are independently
11 controlled by the memory controller 202 via separate buses (not shown). The hard
12 disk drive 208 and portable media drive 106 are connected to the memory
13 controller via the PCI bus and an ATA (AT Attachment) bus 216.

14 A 3D graphics processing unit 220 and a video encoder 222 form a video
15 processing pipeline for high speed and high resolution graphics processing. Data
16 is carried from the graphics processing unit 220 to the video encoder 222 via a
17 digital video bus (not shown). An audio processing unit 224 and an audio codec
18 (coder/decoder) 226 form a corresponding audio processing pipeline with high
19 fidelity and stereo processing. Audio data is carried between the audio processing
20 unit 224 and the audio codec 226 via a communication link (not shown). The
21 video and audio processing pipelines output data to an A/V (audio/video) port 228
22 for transmission to the television or other display. In the illustrated
23 implementation, the video and audio processing components 220-228 are mounted
24 on the module 214.

Also implemented on the module 214 are a USB host controller 230 and a network interface 232. The USB host controller 230 is coupled to the CPU 200 and the memory controller 202 via a bus (e.g., PCI bus) and serves as host for the peripheral controllers 104(1)-104(4). The network interface 232 provides access to a network (e.g., Internet, home network, etc.) and may be any of a wide variety of various wired or wireless interface components including an Ethernet card, a modem, a Bluetooth module, a cable modem, and the like.

The game console 102 has two dual controller support subassemblies 240(1) and 240(2), with each subassembly supporting two game controllers 104(1)-104(4). A front panel I/O subassembly 242 supports the functionality of the power button 112 and the eject button 114, as well as any LEDs (light emitting diodes) or other indicators exposed on the outer surface of the game console. The subassemblies 240(1), 240(2), and 242 are coupled to the module 214 via one or more cable assemblies 244.

Eight memory units 140(1)-140(8) are illustrated as being connectable to the four controllers 104(1)-104(4), i.e., two memory units for each controller. Each memory unit 140 offers additional storage on which games, game parameters, and other data may be stored. When inserted into a controller, the memory unit 140 can be accessed by the memory controller 202.

A system power supply module 250 provides power to the components of the gaming system 100. A fan 252 cools the circuitry within the game console 102.

The game console 102 implements a uniform media portal model that provides a consistent user interface and navigation hierarchy to move users through various entertainment areas. The portal model offers a convenient way to

1 access content from multiple different media types—game data, audio data, and
2 video data—regardless of the media type inserted into the portable media drive
3 106.

4 To implement the uniform media portal model, a console user interface (UI)
5 application 260 is stored on the hard disk drive 208. When the game console is
6 powered on, various portions of the console application 260 are loaded into RAM
7 206 and/or caches 210, 212 and executed on the CPU 200. The console
8 application 260 presents a graphical user interface that provides a consistent user
9 experience when navigating to different media types available on the game
10 console.

11 The gaming system 100 may be operated as a standalone system by simply
12 connecting the system to a television or other display. In this standalone mode,
13 the gaming system 100 allows one or more players to play games, watch movies,
14 or listen to music. However, with the integration of broadband connectivity made
15 available through the network interface 232, the gaming system 100 may further
16 be operated as a participant in a larger network gaming community.

17 Fig. 3 shows an example network gaming environment 300 that
18 interconnects multiple gaming systems 100(1), ..., 100(g) via a network 302. The
19 network 302 represents any of a wide variety of data communications networks. It
20 may include public portions (e.g., the Internet) as well as private portions (e.g., a
21 residential Local Area Network (LAN)), as well as combinations of public and
22 private portions. Network 302 may be implemented using any one or more of a
23 wide variety of conventional communications media including both wired and
24 wireless media. Any of a wide variety of communications protocols can be used
25

1 to communicate data via network 302, including both public and proprietary
2 protocols. Examples of such protocols include TCP/IP, IPX/SPX, NetBEUI, etc.

3 In addition to gaming systems 100, one or more online services 304(1), ...,
4 304(s) may be accessible via the network 302 to provide various services for the
5 participants, such as hosting online games, serving downloadable music or video
6 files, hosting gaming competitions, serving streaming audio/video files, and the
7 like. The network gaming environment 300 may further involve a key distribution
8 center 306 that plays a role in authenticating individual players and/or gaming
9 systems 100 to one another as well as online services 304. The distribution center
10 306 distributes keys and service tickets to valid participants that may then be used
11 to form games amongst multiple players or to purchase services from the online
12 services 304.

13 The network gaming environment 300 introduces another memory source
14 available to individual gaming systems 100 – online storage. In addition to the
15 portable storage medium 108, the hard disk drive 208, and the memory unit(s)
16 140, the gaming system 100(1) can also access data files available at remote
17 storage locations via the network 302, as exemplified by remote storage 308 at
18 online service 304(s).

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Fig. 4 shows the uniform media portal model 400. It provides a main menu 402 that acts as a common interface for multiple media types, including game media, movie media, and music media. The main menu 402 presents the user with a set of navigation choices that accurately describe what they would like to interact with on their console. This top-level menu is a simple representation of the three primary entertainment areas available on the console, thus presenting the following choices:

- Games: This entertainment area pertains to a user's game experience and gaming media.
- Music: This entertainment area is dedicated to the music context and audio media.
- Movies: This entertainment area relates to a user's movie experience and video media.

The model's navigation hierarchy follows the media theme. Beneath the main menu 402 are collections of titles that pertain to their particular media types currently available to the user. In this example, a user can navigate from the main menu 402 to a games collection 404 that lists currently available game titles. Navigation may also be made to a music collection 406 that groups available music titles and a movie collection 408 that groups available movie titles. By constructing the hierarchy in terms of media type, the user is intuitively presented with titles within any given entertainment area. The titles within the various areas may be stored in any one of many storage locations, but such detail is not immediately revealed. Thus, the uniform media portal model 400 offers a

1 coherent way to access multiple media types regardless of the media type inserted
2 into the gaming system's portable media drive.

3 Area specific features, such as high scores on a game or creating a
4 soundtrack, are left for lower levels of the model 400. Thus, beneath each
5 collection is the specific play area that pertains to the particular media experience.
6 A games play area 410 is navigated through the games collection 404, a music
7 play area 412 is accessed through the music collection 406, and a movies play area
8 414 is navigated through the movie collection 408. This organization of the model
9 allows users to select the context of the media type. This model thus provides a
10 high-level "filter" on the kinds of media available on the console, and what
11 operations may be performed with respect to the media.

12 The model 400 also accommodates system areas, including a memory area
13 416 and a settings area 418. The memory area 416 allows users to view memory
14 contents and manage the memory devices in the console. The settings area 418
15 allows users to preview currently set options, as well as adjust the settings as
16 desired.

17 The console application 260, which implements the uniform media portal
18 model 400, is stored in the hard disk drive 208 of the console 102. The console
19 application 260 is loaded each time the console is powered on. When power is
20 initially applied and before presenting the main menu or loading a title, the
21 console application 260 runs through an initialization cycle.

22 Fig. 5 illustrates an example graphical user interface 500 depicting the main
23 menu of the gaming system. The main menu UI 500 is generated by the console
24 UI application 260 and depicted on the television or other display. The main
25 menu UI 500 contains the five menu elements: a games element 502, a music

1 element 504, a movies element 506, a memory element 508, and a setting element
2 510. These elements provide the navigation entry points for the five level-one
3 areas of the uniform media portal model 400, namely, the games collection 404,
4 the music collection 406, the movie collection 408, the memory 416, and the
5 settings 418. Environmental background audio may be played when entering the
6 main menu to further enhance the user environment.

7 The focus on the main menu UI 500 is initially placed on the games
8 element 502, but other default positions may be alternatively employed. Any of
9 the four controllers 104(1)-104(4) may be used to navigate the console user
10 interface. The main menu is navigated from left to right with any of the connected
11 controller thumbsticks. “D-pad” and left analog thumbstick actions are treated the
12 same. The console UI application 260 recognizes all button presses and
13 thumbstick movements from every controller 104, so moves from multiple
14 thumbsticks simultaneously may result in a “tug-of-war” navigation. In one
15 implementation, the navigation does not wrap once the user has reached the far left
16 or right extent of the main menu UI 500, thus attempting to move right once the
17 user has reached the settings element 510 or to move left once the user has reached
18 the games element 502 will have no effect.

19 A select element 512 allows the user to select the focused element from
20 among the five main menu elements 502-510. The “A” button on the controller is
21 used to control the select element 512, and hence the graphical select element 512
22 illustrates an “a” within the element. Upon selection, the console UI application
23 navigates to the selected area.

24 Fig. 6 is a flow diagram of the main menu navigation process 600 that is
25 performed after the gaming system is initialized. The process 600 is implemented

1 in software as computer-executable instructions that are executed by the CPU 200
2 to perform the operations illustrated as blocks. The process generally discerns
3 which main menu element is selected and navigates to the selected area.

4 At block 602, the console application 260 determines whether the games
5 element 502 is selected. If so (i.e., the “Yes” branch from block 602), the console
6 application 260 navigates to the games collection 404 and presents a games
7 collection menu (block 604). If the games element is not selected, block 606
8 determines whether the music element 504 is selected. If the music element 504 is
9 selected, the console UI application 260 navigates to the music collection 406 and
10 presents a music collection menu (block 608). As discussed below, the music
11 collection menu includes options to create, edit, and play soundtracks through the
12 gaming system.

13 If the movies element 506 is selected (block 610), the console UI
14 application 260 navigates to the movies collection 408 and presents a movie player
15 (block 612). If the memory element 508 is selected (block 614), the console UI
16 application 260 navigates to the memory area 416 and presents a memory
17 collection menu (block 616). Finally, if the settings element 510 is selected (block
18 618), the console UI application 260 navigates to the settings area 418 and
19 presents a settings collection menu (block 620).

20 Fig. 7 illustrates a graphical user interface depicting a music collection
21 menu 700 that is presented upon selection of the music element 504 in the main
22 menu UI 500 (Fig. 5). The music collection is the area where the user can select
23 from available audio discs in the portable media drive 106 as well as soundtracks
24 they have previously created and stored on the hard disk drive 208. The music
25 collection menu 700 includes a list 702 of the available audio discs in the portable

1 media drive (if any) and soundtrack files on the hard disk drive. An example of a
2 suitable audio disc is a Redbook audio CD (compact disc). An example of a
3 suitable soundtrack file is one or more WMA files copied from an audio CD, an
4 audio DVD, a game disc, an online source, or other audio source.

5 An orb 704 contains a graphic of the currently selected audio item and a
6 meta data panel 706 posts information about the current audio element. As the
7 user navigates over the list 702 of the available audio discs and soundtracks,
8 corresponding summary information is posted in the meta data panel 706. The
9 following information is displayed for the currently selected audio disc or
10 soundtrack:

- 11
- 12 • Name of the audio element as it appears in the list
- 13 • Total number of tracks
- 14 • Total playing time for the audio element in minutes and seconds
- 15

16 In this example, the audio CD is highlighted in list 702 and hence a CD
17 image is presented in orb 704. As indicated by the meta data panel 706, the audio
18 CD is the 14-track album “Earthling” by David Bowie.

19 When network access is available, meta data regarding an audio source
20 (such as artist, album, track titles, song, genre information, release date, etc.) can
21 be retrieved from online services over the network (e.g., the Internet) at any time.
22 If network access is not available, but a local database storing such meta data is
23 available, then the meta data regarding the audio source can be retrieved from the
24 local database. If network access is not available, and a local database of meta
25

1 data is not available, then an identifier of the audio source is stored so that the
2 meta data can be retrieved at a later time, as discussed in more detail below.

3 Descriptive text 708 (i.e., “n items”) is positioned beside the main legend
4 “Music Collection” to indicate the number of titles in the music collection. The
5 list 702 displays a limited number of music titles (e.g., eight titles). When a user
6 first enters the music collection after purchasing their console, there will be zero
7 titles in the music collection (i.e., “0 items”). In this situation, the music
8 collection menu 700 is bypassed and the user is navigated to the music player
9 screen (shown and described below with respect to Fig. 8). The title of the music
10 player screen is “no audio CD” and all of the playback buttons in the area are
11 disabled. The user may only navigate back to the main menu 500 (Fig. 5).

12 If the user only has a single audio disc in the portable media drive, or a
13 single soundtrack in the music collection, the user is automatically navigated past
14 the music collection menu 700 when coming from the main menu and is taken
15 directly to the music player screen. As the user creates multiple soundtracks and
16 stores them in the hard disk drive, the music collection menu 700 is no longer
17 bypassed, but instead presents the available soundtracks in the list 702. When the
18 descriptive text 708 indicates that there are more music titles than shown on list
19 702 (e.g., $n > 8$), up/down scroll arrows are added to the list 702 to represent that
20 more titles are available.

21 The user can move among music titles in list 702 by using the up and down
22 directions of the thumbstick, or some other pre-defined control mechanism. The
23 list 702 may be configured to wrap or not wrap when the user reaches the top or
24 the bottom of the list. A select element 710 enables user selection of the
25 highlighted title from list 702 using the “A” button on the controller. Selection of

1 a game title navigates the user to the music player menu. A back element 712
2 facilitates navigation back to the main menu UI 500 by pressing the “B” button on
3 the controller.

4 Fig. 8 illustrates a graphical user interface depicting an example music
5 player 800 that is accessible from the music collection menu or, where no music
6 titles are listed, upon loading a music disc. The music player allows the user to
7 play back the current audio disc in the portable media drive 106 or previously
8 created soundtracks. The music player 800 includes a track list 802 of the
9 available audio tracks and corresponding track lengths, an orb 804 that contains a
10 radial spectrum analyzer (or other music related visual), and a status element 806
11 that displays the current playback status and timeline of the current track. During
12 audio playback, the current track being played within the track list 802 is
13 highlighted. If meta data regarding the tracks is available, track-specific
14 information (e.g., song titles) may be displayed rather than the notation "Track x").
15 The status element 806 renders the following information for the user:

- 17 • Current time within the current track
- 18 • Visual progress bar for the current track
- 19 • Simple playback icons to denote playback status (e.g., play, pause, stop,
20 repeat, random)

21
22 A transport control panel 812 is displayed along the bottom of the music
23 player for playback control. An example control panel 812 includes a play/pause
24 button, a stop button, a skip forward button, a skip back button, a random track
25 selection button, and a repeat button. When the user first navigates into the music

1 player from the main menu or the music collection, the play button in the transport
2 control panel 812 is in focus by default. Buttons on the game controller 104 may
3 be mapped to the transport control buttons. For example, a white button on the
4 controller might be mapped to the play/pause toggle button, the black controller
5 button might be mapped to the stop button, the left trigger might be mapped to the
6 previous track button, and the Right trigger might be mapped to the next track
7 button.

8 A “copy song” button 816 is also displayed in the music player UI 800.
9 When the copy song button 816 is selected, the user is navigated into the
10 soundtrack creation tool with the current audio disc or soundtrack as the source.
11 The soundtrack creation tool allows one or more tracks to be copied to a
12 soundtrack. The soundtrack creation tool is discussed in greater detail below.

13 A select element 808 enables user selection of the highlighted audio track
14 from list 802 using the “A” button on the controller. A back element 810
15 facilitates navigation back to the previous menu by pressing the “B” button on the
16 controller.

17 Fig. 9 illustrates a graphical user interface depicting another example music
18 player 820. Music player 820 can be accessible from the music collection menu,
19 upon loading a music disc, or may be accessible from some other location or user
20 interface. Similar to music player 800 of Fig. 8, music player 820 allows the user
21 to play back the current audio disc in the portable media drive 106 or previously
22 created soundtracks. The music player 820 includes a status element 826 that
23 displays the current playback status and timeline of the current track.

24 A transport control panel 832 is displayed along the bottom of the music
25 player for playback control. An example control panel 832 includes a play/pause

1 button, a stop button, a skip forward button, a skip back button, a repeat button, a
2 random track selection button, and a disc eject button. When the user first
3 navigates into the music player 820, the play button in the transport control panel
4 832 is in focus by default. Buttons on the game controller 104 may be mapped to
5 the transport control buttons. For example, a white button on the controller might
6 be mapped to the play/pause toggle button, the black controller button might be
7 mapped to the stop button, the left trigger might be mapped to the previous track
8 button, and the Right trigger might be mapped to the next track button.

9 Additional buttons may also be included in a display control panel 834 to
10 alter what is displayed to the user during playback of the audio track(s). Examples
11 of display control buttons that may be included in the display control panel 834
12 include a spectrum analyzer button that causes a graphical representation of the
13 audio waveform output during playback of the audio track(s) to be displayed, a
14 track list display button that causes a list of the tracks of the current audio disc in
15 the portable media drive 106 or a soundtrack to be displayed, a reduce button to
16 reduce the size of a track list being displayed (or remove the track list from the
17 display, leaving transport control panel 832, status element 826, and display
18 control panel 834 as illustrated in Fig. 9), a photo album button that causes digital
19 images and/or digital video to be displayed during playback of the audio track(s), a
20 karaoke button that causes the lyrics of the audio track(s) to be displayed during
21 playback of the audio track(s), and a button that changes the background 836 on
22 which the transport control panel 832, status element 826, and display control
23 panel 834 are overlaid as illustrated in Fig. 9. Buttons on the game controller 104
24 may be mapped to the display control buttons.

1 Although not shown in Fig. 9, a track list of the available audio tracks and
2 corresponding track lengths of the current audio disc in the portable media drive
3 106 or of a soundtrack can be displayed. During audio playback, the current track
4 being played within the track list can be highlighted. Additionally, if meta data
5 regarding the tracks is available, track-specific information (e.g., song titles) may
6 be displayed in the track list.

7 Fig. 10 illustrates a graphical user interface depicting another example
8 music collection menu 860. Music collection menu 860 may be presented upon
9 selection of music element 504 in the main menu UI 500, or alternatively upon
10 selection of some other user interface element or running of some other program.
11 Although the display is different, music collection menu is similar to music
12 collection menu 700 of Fig. 7, allowing the user to select from available audio
13 discs in the portable media drive 106 as well as soundtracks that have been
14 previously created and stored on the hard disk drive 208.

15 The music collection menu 860 includes a list 862 of the available audio
16 discs in the portable media drive (if any) and soundtrack files on the hard disk
17 drive. An example of a suitable audio disc is a Redbook audio CD (compact disc).
18 An example of a suitable soundtrack file is one or more WMA files copied from
19 an audio CD, an audio DVD, a game disc, an online source, or other audio source.
20 When there are more music titles than shown on list 862 (e.g., greater than 6),
21 up/down scroll arrows (not shown) can be added to the list 862 to represent that
22 more titles are available.

23 Although not illustrated in Fig. 10, when available meta data regarding an
24 audio source may also be displayed in music collection menu 860. For example,
25 an additional meta data panel may be displayed that displays meta data regarding

1 the currently highlighted disc or soundtrack in list 862. When network access is
2 available, meta data regarding an audio source (such as artist, album, track titles,
3 song, genre information, release date, etc.) can be retrieved from online services
4 over the network (e.g., the Internet) at any time. If network access is not available,
5 but a local database storing such meta data is available, then the meta data
6 regarding the audio source can be retrieved from the local database. If network
7 access is not available, and a local database of meta data is not available, then an
8 identifier of the audio source is stored so that the meta data can be retrieved at a
9 later time, as discussed in more detail below.

10 The user can move among music titles in list 862 by using the up and down
11 directions of the thumbstick, or some other pre-defined control mechanism. The
12 list 862 may be configured to wrap or not wrap when the user reaches the top or
13 the bottom of the list. One or more buttons on the game controller 104 may be
14 mapped to the selection of highlighted title from list 862 (e.g., using the "A"
15 button on the controller). Selection of a game title navigates the user to a music
16 player menu.

17 In the illustrated example of Fig. 10, list 862 overlays a display of other
18 information (e.g., a track list, the transport control panel 832, status element 826,
19 and display control panel 834 discussed above with respect to Fig. 9).

20 Fig. 11 illustrates a graphical user interface depicting an example screen
21 display 900 used to select an existing soundtrack or create a new soundtrack. As
22 noted above, users can create their own soundtracks by copying audio tracks from
23 one or more audio sources. Screen display 900 provides users with a list 902 of all
24 soundtracks available to the gaming system. Such soundtracks may be stored on
25 the hard disk drive 208, a portable disc medium 108 in drive 106, a memory unit

1 140, or at remote storage 308 at an online source 304. If the user has created at
2 least one soundtrack, the list 902 depicts one or more placards of available
3 soundtracks. A user entered name, or a default name “soundtrack 1”, “soundtrack
4 2”, etc., is shown on the placards.

5 A “New Soundtrack” button 904 is positioned beside the list to enable the
6 user to create a new soundtrack. Upon selection of a soundtrack in the list 902 or
7 the “New Soundtrack” button 904, the user is navigated to a track selection screen
8 described below with respect to Fig. 14. If the user has not yet created a
9 soundtrack, the list 902 of available soundtracks is empty. Upon choosing the
10 “New Soundtrack” button 904, the user is presented with an area for text entry and
11 a virtual keyboard for typing a new name for the soundtrack. By default, the name
12 given to the soundtrack will be “Soundtrack 1”, but any keyboard input from the
13 user will replace this default title with the entered name.

14 Fig. 12 illustrates the creation of a soundtrack using a variety of different
15 audio sources. A new soundtrack 1002 is created by selecting audio tracks from
16 one or more different audio sources. Examples of audio sources illustrated in Fig.
17 12 include audio CDs 1004 and 1006, game discs 1008 and 1010, WMA files 1012
18 and 1014, and audio DVDs 1016 and 1018. Although a limited number of audio
19 sources are illustrated in Fig. 12, soundtrack 1002 can be created using audio
20 tracks from any number of audio sources that represent any number of artists. The
21 audio tracks that comprise soundtrack 1002 can be arranged in any order,
22 regardless of the audio source or the time at which the audio track was retrieved or
23 copied.

24 Audio CDs 1004 and 1006 typically include multiple audio tracks.
25 Soundtrack 1002 may contain one or more audio tracks from one or more audio

1 CDs. Game discs 1008 and 1010 may contain one or more audio tracks that are
2 played during the game. One or more of those audio tracks may be included in the
3 user-created soundtrack 1002. WMA files 1012 and 1014 may be stored locally
4 on the hard disk drive or available from an online source. Each WMA file may
5 contain one or more audio tracks. One or more audio tracks from one or more
6 WMA files may be included in soundtrack 1002. Additionally, one or more
7 MPEG Layer 3 (MP3) audio files (not shown) may be included in soundtrack
8 1002. MP3 files may be stored locally on the hard disk drive or available from an
9 online source. Audio DVDs 1016 and 1018 typically include multiple audio
10 tracks. Soundtrack 1002 may include one or more audio tracks from one or more
11 audio DVDs.

12 Fig. 13 is a flow diagram illustrating a process 1100 for creating a new
13 soundtrack. The process 1100 is implemented in software as computer-executable
14 instructions that are executed by the CPU 200 to perform the operations illustrated
15 as blocks. Initially, the gaming system 100 creates a new soundtrack file to
16 receive the selected audio tracks (block 1102). The user is given the opportunity
17 to name the soundtrack. If the user does not provide a name, a default name
18 "Soundtrack n" is applied to the soundtrack. The default name can later be
19 changed by the user.

20 At block 1104, the console application 260 presents a list of audio sources
21 from which to retrieve or copy audio tracks. Next, the user selects an audio source
22 from the list of audio sources (block 1106). The console application 260 then
23 presents a list of audio tracks available from the selected audio source (block
24 1108). The user then selects one or more audio tracks from the list to include in
25 the soundtrack (block 1110). At block 1112, the console application 260 retrieves

1 the selected audio tracks and adds the audio tracks to the soundtrack. If necessary,
2 the console application 260 converts the retrieved audio files into WMA format.
3 For example, audio tracks from an audio CD or an audio DVD are converted from
4 their native format into WMA format prior to adding the audio tracks to the
5 soundtrack. Similarly, MP3 files are converted from MP3 format to WMA format
6 before adding the audio tracks to the soundtrack.

7 At block 1114, the console application 260 determines whether more audio
8 tracks are to be added to the soundtrack. This determination is performed, for
9 example, by querying the user as to whether they want to add more tracks. If
10 additional tracks are to be added to the soundtrack, the process 1100 returns to
11 block 1104, where the user is presented with a list of audio sources. Alternatively,
12 the process 1100 may return to block 1106, which allows the user to select another
13 audio track from the same audio source as the previous selection.

14 After all audio tracks have been added to the soundtrack, the process 1100
15 returns to the music collection menu (block 1116) shown in Fig. 7 (or alternatively
16 Fig. 10). At this point, the music collection menu displays the newly created
17 soundtrack in the list of available soundtracks.

18 Each user of a game console 102 can have their soundtracks stored
19 separately from the soundtracks created by other console users. For example,
20 when a user completes the creation of a new soundtrack, the soundtrack is stored
21 in an area on the hard disk drive associated with that user or a user attribute is
22 stored with the soundtrack indicating the creator of the soundtrack. Thus, when a
23 particular user identifies themselves to the game console, the game console
24 displays the soundtracks created by that particular user.

Fig. 14 illustrates a graphical user interface depicting an example audio track selection screen 1200 displayed during the creation of a soundtrack. Audio track selection screen 1200 includes a list 1202 of available audio tracks (e.g., from an audio disc or an online source), and a corresponding list 1204 of audio tracks that are already in the soundtrack. The user then selects a single audio track, or multiple tracks, to be included in the soundtrack. The screen 1200 also depicts a status area 1208 that identifies the progress of the total operation. The ordering of the audio tracks in list 1204 can be adjusted by dragging a particular audio track to the desired location in the list and releasing the audio track. The list 1204 is then reordered to reflect the new location of the audio track.

A particular implementation of the audio track selection screen may include a “name soundtrack” button that allows the user to assign a name to the soundtrack. The name can be entered using a virtual keyboard or other character input mechanism. The audio track selection screen may also include a delete button that allows the user to delete a particular song from the soundtrack.

After the soundtrack is completed, a select element 1206 is activated by using the “A” button on the controller. This select element causes the system to navigate back to the music collection menu. A back element 1210 facilitates navigation back to the previous menu by pressing the “B” button on the controller.

If the user cancels a file copy operation, those audio files being copied or retrieved will be lost. If a power off occurs while creating a soundtrack, any audio files being copied or retrieved will not be included in the soundtrack.

In a particular implementation, soundtracks are stored as one or more WMA files on the gaming system 100. Specifically, WMA files for soundtracks are stored in a flat directory on the hard disk drive 208. This directory also

1 contains a text data file that maintains a reference of all WMA files, as well as the
2 soundtracks to which each WMA file belongs. Because the game console
3 manages the soundtrack directory, it is possible to keep this data file up to date.
4 An API (application program interface) may be used to allow a game to query
5 such information as the list of available soundtracks, the first audio file of a
6 specific soundtrack, the last audio file of a specific soundtrack, and the next audio
7 file in a specific soundtrack. Alternatively, the WMA files for each soundtrack
8 may be stored in a separate folder (which may result in copies of the same WMA
9 file existing in multiple folders).

10 Fig. 15 is a flow diagram illustrating a process 1300 that determines which
11 soundtrack to play when a particular game is launched. The process 1300 is
12 implemented in software as computer-executable instructions that are executed by
13 the CPU 200 to perform the operations illustrated as blocks. When a user plays a
14 game, the user can choose to listen to the game's default soundtrack or listen to a
15 different soundtrack. If the user becomes tired of the game's default soundtrack,
16 the user can create a new soundtrack and associate that soundtrack with the game
17 title such that the new soundtrack is played when the game is launched instead of
18 the game's default soundtrack. This new soundtrack is referred to as a "user-
19 associated soundtrack."

20 The process 1300 begins when a user selects a game to play (block 1302).
21 The game may be selected, for example, by inserting a game disc in the portable
22 media drive 106, by selecting a game from list of games stored on the hard disk
23 drive 108, or by selecting a game from an online source. The console application
24 260 determines whether the selected game has a user-associated soundtrack (block
25 1304). If the selected game has a user-associated soundtrack, the game is

1 launched and the user-associated soundtrack is played during the execution of the
2 game (block 1306).

3 If the selected game does not have a user-associated soundtrack, the
4 console application 260 presents the user with an option to select a soundtrack or
5 play the game using the default soundtrack (block 1308). Next, the console
6 application 260 determines whether the user selected a soundtrack or the default
7 soundtrack (block 1310). If the user selects the default game soundtrack, the game
8 is launched and the default game soundtrack is played during the execution of the
9 game (block 1312). If the user selects to choose a soundtrack, the user is
10 presented with the available soundtracks stored on the gaming system (block
11 1314). The game is then launched and the selected soundtrack is played during the
12 execution of the game (block 1316).

13 When the user selects a soundtrack to play instead of the default
14 soundtrack, the user is presented with the option of making the soundtrack change
15 “permanent.” If the change is made permanent, the selected soundtrack will be
16 played instead of the default soundtrack each time the game is played. Thus, the
17 user is not required to select the new soundtrack each time the game is played –
18 the system will remember the new soundtrack until the user specifically changes
19 the soundtrack or specifically requests the gaming console to begin using the
20 default game soundtrack.

21 Since the soundtrack is played from the hard disk drive, the playback of the
22 soundtrack does not interfere with the execution of the game from the game disc.
23 The game disc remains in the game console while the soundtrack executes,
24 thereby eliminating the game disruptions that would occur if the game disc was
25 removed and replaced with an audio CD. The user can change soundtracks in the

1 middle of a game by pausing the game and selecting a different soundtrack. The
2 game is then “un-paused” and game play continues at the point where the game
3 was previously paused. The new soundtrack is played back from the hard disk
4 drive while the game executes from the game disc.

5 Returning to Fig. 12, audio sources (particularly audio CDs and audio
6 DVDs) frequently have meta data associated with them. This meta data can
7 include various information about the content of the audio sources, such as artist
8 information (e.g., name, history, biographies, past and/or present members of a
9 group, etc.), release date of the content (e.g., an album release date), song titles,
10 song composer and/or arranger information, lyrics, album cover art, and so forth.
11 This meta data is frequently stored somewhere other than the audio source (e.g.,
12 the meta data for a particular audio CD may be part of a database of meta data for
13 many different audio sources that is stored on a network server rather than on the
14 audio CD). When available, this information or selected portions of it can be
15 presented to the user to enhance the user's experience. For example, song titles in
16 a soundtrack can be displayed to the user rather than simply displaying "Track x".

17 Many audio sources have an identifier associated with them that allow the
18 audio source to be uniquely (or almost uniquely) identified. This identifier may be
19 an actual identifier that is part of the audio source (e.g., an alphanumeric string
20 stored on a CD or DVD), or alternatively may be generated based on the contents
21 of the audio source. Depending on the manner in which the identifier is generated,
22 the identifier may or may not be unique, but the situation of two audio sources
23 having the same identifier should be at least unlikely. Additionally, audio source
24 identifiers may be generated in different manners for different audio sources (e.g.,
25

1 for different audio CDs) or different types of audios sources (e.g., for audio CDs
2 and audio DVDs).

3 By way of example, audio CDs are typically uniquely identified by using
4 what is referred to as table of contents (TOC) information. Audio CDs typically
5 store songs as different tracks on the CD, and each track is made up of multiple
6 "frames" of audio data. In one implementation, each frame of audio data is 1/75 of
7 a second of audio data. The table of contents information refers to: the total
8 number of tracks on the disc, the starting frame offset of each track, and the total
9 number of frames on the disc.

10 By way of another example, an identifier for a DVD may be generated
11 based on a CRC 64 (64-bit Cyclical Redundancy Checking) of portions of the
12 DVD. In one implementation, these portions are the first parts (e.g., 64Kb) of the
13 video_ts.ifo and the vts_01_0.ifo on a DVD disc.

14 In order to make use of such meta data, when an audio track is stored on the
15 game console 102, the identifier of the audio source as well as an indication of the
16 particular audio track of the audio source is stored on the game console 102. The
17 audio source identifier and the audio track indicator are associated with that audio
18 track on the game console 102. This association can be performed in different
19 manners. In one particular implementation, the audio source identifier and the
20 audio track indicator are stored as part of the same WMA file as the audio track.
21 In another implementation, the audio source identifier and the audio track
22 indicator are stored separately (e.g., in a table or database that stores the audio
23 source identifier, audio track indicator, and a pointer or link to (or other identifier
24 of) the audio track on the game console 102).

1 An audio source identifier and audio track indicator are also stored when an
2 audio track is added to a soundtrack, regardless of whether the audio track is
3 stored on the game console. Additionally, it should also be noted that the audio
4 source identifier and audio track indicator may be stored in various locations, such
5 as on the internal hard disk drive of game console 102, or somewhere other than
6 the game console 102 (such as on some remote server accessed over a network, or
7 on a memory unit 140).

8 Storing the audio source identifier and the audio track indicator on the
9 game console 102 allows the meta data associated with the audio track to be
10 retrieved at a later time, even though the audio source may no longer be accessible
11 to the game console 102 (e.g., an optical disc may be removed from the game
12 console 102). The later time at which the meta data is retrieved can vary. For
13 example, the later time may occur when a database is available locally to game
14 console 102 (e.g., on an optical disc). By way of another example, the later time
15 may occur when a program is subsequently installed and executed on game
16 console 102 (e.g., no program on game console 102 may display the meta data
17 when the audio source identifier and audio track indicator are stored on game
18 console 102, but such a program may subsequently be installed on game console
19 102). By way of yet another example, the later time may occur when Internet
20 access is available and an online service that maintains the meta data is accessible
21 via the Internet.

22 Fig. 16 is a flow diagram illustrating an example process 1400 that adds
23 meta data to the gaming system. The process 1400 is implemented in software as
24 computer-executable instructions that are executed by the CPU 200 to perform the
25 operations illustrated as blocks.

1 The process 1400 begins when audio tracks are copied from an audio
2 source to the game console 102, or alternatively when the audio tracks are
3 otherwise added to a soundtrack (block 1402). The copying in block 1402 can be,
4 for example, the copying of audio tracks to the game console 102 when creating a
5 soundtrack as discussed above. In addition to copying the audio tracks, the audio
6 source identifier and the audio track indicator are also stored on the game console
7 102 (block 1404).

8 At some later time, a meta data lookup is triggered (block 1406). This
9 trigger may be the installation of a particular program on the game console 102
10 that uses the meta data (e.g., some future application that may or may not be
11 identified at the time the audio track(s) are copied), the coupling of the game
12 console 102 to the Internet, the accessibility of a local database of meta data, and
13 so forth. The meta data lookup may be triggered when a particular audio track is
14 accessed (e.g., when the user selects a particular soundtrack, the meta data lookup
15 may be performed for the audio track(s) in that soundtrack), or alternatively may
16 be performed in the background when the meta data is available (e.g., as soon as a
17 local database of meta data is available, the game console 102 may operate to
18 check the audio track(s) stored on the game console 102 to determine whether
19 there is meta data in the database for that audio track(s)).

20 When the meta data lookup is triggered, the database of meta data is
21 accessed and the audio source identifier and audio track indicator are used to look
22 up in the database the meta data for the audio track (block 1408). The meta data
23 from the database that is associated with the audio track is then copied from the
24 database to the gaming system 100 (block 1410). Once copied to the gaming
25 system 100, the meta data can be used by the game console 102 (block 1412).

1 After the meta data is copied to the game console 102, the meta data is
2 associated with a particular track that is stored on the game console and/or is part
3 of a soundtrack. The meta data can be stored as part of the soundtrack file, as part
4 of the same WMA file as the audio track, or alternatively elsewhere (e.g., as a
5 record in a table or database that stores the meta data and a pointer or link to (or
6 other identifier of) the audio track on the gaming system 100). The meta data can
7 be stored using any of a variety of data structures.

8 It should be noted that process 1400 of Fig. 16 can be used for audio tracks
9 that are part of a soundtrack as well as audio tracks that are not part of a
10 soundtrack. For example, process 1400 can be used with audio tracks that are
11 copied to the game console 102 for playback by game console 102 but that are not
12 included in any soundtrack at game console 102.

13 The manner in which the meta data is used by the game console 102 can
14 vary. In one implementation, the meta data is used to create an enhanced user
15 experience when using soundtracks. Figs. 17A and 17B illustrate example screens
16 displayed to identify the audio tracks in a soundtrack. Screen 1502 of Fig. 17A
17 identifies eight tracks that are part of a soundtrack. Screen 1504 of Fig. 17B
18 identifies the same eight tracks that are part of the same soundtrack, but meta data
19 has been incorporated into the screen so that the song titles for each of the eight
20 tracks is displayed. Screen 1504 may be displayed, for example, as list 1204 of
21 Fig. 14. Displaying the song titles to the user can enhance the user's experience
22 because it allows, for example, the user to view and select audio tracks based on
23 the song titles rather than requiring the user to remember which song a particular
24 track is.

1 Fig. 18 illustrates another example screen 1600. Screen 1600 may be
2 displayed when a soundtrack is being displayed, or alternatively at other times
3 (e.g., as part of a graphical user interface depicting a music player). Screen 1600
4 includes a list 1602 of multiple audio tracks using retrieved meta data (e.g., the
5 song titles as illustrated). Screen 1600 also includes an album description or
6 graphic portion 1604 in which information describing an album which contains
7 one or more of the audio tracks in list 1602 (even though the track may have been
8 previously copied from the audio source and is no longer available to the gaming
9 system).

10 Screen 1600 also includes user-selectable buttons 1606 and 1608, each of
11 which may be selected, for example, by using a button or trigger on the controller.
12 Selection of button 1606 causes lyrics for one or more of the audio tracks in list
13 1602 to be displayed (e.g., as part of a separate screen or as part of screen 1600,
14 such as in portion 1604). Selection of button 1608 causes information about the
15 artist of one or more of the audio tracks in list 1602 to be displayed (e.g., as part of
16 a separate screen or as part of screen 1600, such as in portion 1604).

17 It should be noted that the database that stores the meta data may change
18 over time. For example, as new audio CDs are released, meta data corresponding
19 to those new audio CDs would be added to the database. In situations where the
20 database of meta data is maintained locally at the gaming system, updates to the
21 database may be performed at regular or irregular intervals. For example, weekly
22 or monthly updates may be retrieved over the Internet, or discs with the updates
23 may be mailed (e.g., using the postal service) to the user of a gaming system.

24 It should also be noted that a user may generate his or her own meta data
25 and add that meta data to the database, or alternatively to a meta data record

1 associated with a particular track that is stored on the game console. By way of
2 example, the meta data associated with an audio track may include one or more
3 genres into which the audio track is classified. These genres may include a
4 classification that is made by the artist of the audio track (e.g., a genre of "rock"),
5 and/or a classification that is made by the user (e.g., a genre of "racing" for racing
6 games, or a genre of "fighting" for fighting games). By way of another example,
7 user-defined song titles may be included in the meta data, or other user-defined
8 comments or remarks.

9 Thus, it can be seen that the information identifying an audio source and a
10 particular track of that audio source is stored by the gaming system until such time
11 as it is needed to retrieve meta data for the audio track.

12 Although the invention has been described in language specific to structural
13 features and/or methodological acts, it is to be understood that the invention
14 defined in the appended claims is not necessarily limited to the specific features or
15 acts described. Rather, the specific features and acts are disclosed as exemplary
16 forms of implementing the claimed invention.